

CLAIMS

1. A flow control valve comprising:

a main body (1) including a second cavity (8) provided in a lower central portion of the main body being open to a bottom portion, also including an inlet passage (9) communicated with the second cavity (8), also including a first cavity (10), the diameter of which is larger than that of the second cavity (8), an upper face of the first cavity (10) being open to the upper portion, also including an outlet passage (11) communicated with the first cavity (10), and also including a communicated hole (12), the diameter of which is smaller than that of the first cavity (10), the communicated hole (12) communicating the first cavity (10) with the second cavity (8), an upper face of the second cavity (8) composing a valve seat (13);

a bonnet (2) including a cylindrical cavity (16) communicated with a gas supply hole (14) and a gas discharge hole (15) and also including a step portion (17) arranged on a lower end circumferential face;

a spring receiving portion (3) inserted into the step portion (17) of the bonnet (2), having a through-hole (18) at the center;

a piston (4) including a first joining portion (23), the diameter of which is smaller than that of the through-hole (18) of the spring receiving portion (3), provided at a lower end portion, and also including a flange portion (21) provided in an upper portion, the piston (4) being inserted into the cavity (16) of the bonnet (2) so that the piston (4) can be moved upward and downward;

a spring (24) interposed between a lower end face of the flange portion (21) of the piston (4) and an upper end face of the spring receiving portion (3);

a first diaphragm (27), the peripheral portion of which is interposed and fixed between the main

body (1) and the spring receiving portion (3), the first diaphragm (27) covering the first cavity (10) of the main body (1), a central portion of the first diaphragm (27), which forms a first valve chamber (31), being formed
5 thick;

a first valve member (5) including a second joining portion (29) arranged in an upper face central portion, the second joining portion (29) being joined and fixed to the first joining portion (23) of the
10 piston (4) and the through-hole (18) of the spring receiving portion (3), and also including a third joining portion (30) arranged in a lower face central portion coaxially with the communicated hole (12) of the main body (1);

a second valve member (6) including a
15 valve element (32), the diameter of which is larger than that of the communicated hole (12) of the main body (1), located inside the second cavity (8) of the main body (1), also including a fourth joining portion (34)
20 protruding from an upper end face of the valve element (32), joined and fixed to a third joining portion (30) of the first valve member (5), also including a rod (35) protruding from a lower end face of the valve element (32), and also including a second diaphragm (37)
25 extending from a lower end face of the rod (35) in the radial direction; and

a base plate (7) located at a lower position of the main body (1) including a protruding portion (40) arranged at an upper central portion of the
30 base plate (7), a peripheral edge portion of the second diaphragm (37) of the second valve member (6) being interposed and fixed between the main body (1) and the protruding portion (40), a recess portion (41) being provided in an upper end portion of the protruding portion (40), and also including a breathing hole (42)
35 communicated with the recess portion (41), wherein
an opening area of the hydraulic control

portion (39) composed of the valve element (32) of the second valve member (6) and the valve seat (13) of the main body (1) is changed according to an upward and downward motion of the piston (4).

- 5 2. A flow control valve according to claim 1, wherein the main body (1), the first valve member (5) and the second valve member (6) are made of polytetrafluoroethylene.